

Implementation of a Videoconferencing System between Multiple Family Medicine Departments

Case
Report

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Attending conferences is important for doctors and residents in family medicine. Nevertheless, departments of family medicine at many hospitals find it difficult to hold regular conferences. Holding joint videoconferences between Family Medicine Departments of several hospitals through a videoconferencing system could solve this problem. Therefore, Family Medicine Departments of Seoul National University Hospital, Seoul National University Bundang Hospital, and Kangwon National University Hospital decided to hold regular joint videoconferences via a videoconferencing system. Eighty-one joint videoconferences were held from April 1 to October 29, 2010. PowerPoint slideshows were transferred to the other two locations in the same resolution as presenter's monitor. Image and voice of the speaker were transferred in real time and in acceptable quality. Joint videoconferences are feasible, satisfactory and useful for medical education, especially when individual family medicine departments are small and lack resources to hold face-to-face conferences. We expect that more family medicine departments will choose to participate in implementing similar joint videoconferencing systems in the future.

Keywords: Videoconference; Medical Education; Family Medicine

INTRODUCTION

New knowledge is continuously created in medicine.

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Therefore, continuing medical education is critical, and conferences are one of the most useful methods of providing this education.^{1,2)} Doctors and residents in family medicine require continuous education and clinical experience in a variety of specialties. Conferences are mandatory in residency programs. Nevertheless, family medicine departments of many hospitals find it difficult to hold regular, independent conferences.³⁾ Frequency of conferences decreases when a family medicine department has a smaller body of residents and staff.⁴⁾ Seoul National University Bundang Hospital Department of Family Medicine (SNUBHFM) was established in 2009 with three staff members and no residents, and was unable to hold regular conferences for a year. Kangwon National University Hospital Department of Family Medicine (KNUHFM) has six residents and two staff members, and experienced similar difficulties as

SNUBHF. In contrast, Seoul National University Department of Family Medicine (SNUHFM) holds regular conferences, which are facilitated by many physicians of SNUHFM (6 staff members, 14 fellows, 57 residents).

One way of solving the difficulty of holding conferences is to share conferences between multiple family medicine departments using a videoconferencing system.^{4,5)} SNUHFM, SNUBHF, and KNUHFM pursued this strategy to hold regular joint videoconferences.

CASE REPORT

1. Participants and Period of Joint Videoconferences

Joint videoconferences were conducted from April 1 to October 29, 2010. During that period, 6 professors, 14 fellows and 57 residents from SNUHFM, 3 professors and 1 fellow from SNUBHF, and 2 professors and 6 residents from KNUHFM participated in joint videoconferences.

2. Joint Videoconferences

Departments of family medicine of the three hospitals shared conferences in the mornings using a videoconferencing system. Each hospital took turns to make a PowerPoint presentation at each conference, and the other hospitals watched the presentation via internet in real time. After the presentation, all three hospitals participated in feedback and discussion through the videoconferencing system. Eighty-one joint videoconferences were held during the period. These conferences included 39 clinical review presentations, 16 journal reviews and 26 staff lectures (Table 1). Seventy-nine morning conference presentations were given by SNUHFM, while SNUBHF held three staff lectures. PowerPoint slideshows were transferred to the other two locations in the same resolution as presenter's monitor, and the images and voices of the speaker were transmitted in real time in acceptable quality (Figures 1–5).

3. Software and Hardware

We used videoconferencing software (V2 conference; V2 Technology, Beijing, China) installed in the Seoul National University College of Medicine. V2 Conference is a web-based

client-server system that allows up to 300 parties to participate in a video-conference simultaneously (Figure 6).

We used highly sensitive microphones (ETM-003; Edutige, Seoul, Korea) and an echocanceler (XING; IPEVO, Taipei, Taiwan) for audio communication and video cameras (VC-03; Canon, Tokyo, Japan) for video communication. Cameras provided a resolution of 640 × 480, and a maximum of 30 video frames per second. The lowest specifications of the computers used for conferencing were Pentium IV 2.0 CPUs and 512 MB RAM. The operating system used was Microsoft Windows XP. Minimum network speed was 100 kbps.

4. Hardware Setup

Two computers, two video cameras, three microphones, and one echocanceler were set up in a SNUHFM conference room, where most of the presentations were held. SNUBHF set up a portable system that consisted of one laptop, one video camera, one microphone, and one echocanceler because SNUBHF does not have its own conference room. A desktop computer installed in each conference rooms was used to project the presentation onto a large screen, and audio and video equipments were connected to a laptop to relay images and sounds. Installation of a mobile system could be completed in about five minutes, making participation in videoconferences possible anywhere with an internet connection. KNUHFM participated in videoconferences via a desktop computer. When necessary, members of KNUHFM could communicate with the other locations through a messenger window provided by the V2 Conference software.

Individuals who were unable to physically come to the conference rooms could participate in videoconferences on their own laptops at any location with an internet connection. With the presenters's permission, videoconferences were recorded as video files and uploaded to an internet materials room for later download and replay.

DISCUSSION

1. Videoconferences

Conferences are an important part of education in family medicine, and most hospitals hold conferences that include

Table 1. Staff lectures from April to October 2010.

Status of staff lecture speaker	Staff lecture title
Professor of SNUH Gynecology	Gynecological examination & guidelines for abnormal Pap smear results
Family Medicine physician	Introduction to the aesthetic clinic
Professor of SNUH Gastroenterology	Recent advances of gastrointestinal medical treatments
Professor of SNUH Gynecology	Diagnosis & treatment of female incontinence
Professor of SNUH Family Medicine	Green clinic: environmental medicine
Professor of SNUH Family Medicine	Smoking cessation treatment: between evidence, above evidence
Professor of SNUH Gastroenterology	Deciding causality of drug-drug interactions and side effect
Family Medicine physician	Procedures of the aesthetic clinic
Professor of SNUH Family Medicine	Social network service
Director of Kyobo Life Insurance	Insurance medicine
Professor of SNUH Family Medicine	Health status of migrants from North Korea and the direction of a health care supporting system for them
Professor of SNUH Radiology	Radiologic management of thyroid nodular disease
Professor of SNUBH Family Medicine	Chronic fatigue syndrome, chronic fatigue clinic
Professor of SNUH Family Medicine	Communication and health system issues in cancer survivorship care
Professor of SNUBH Family Medicine	The power to make a behavioral change-motivation interview
Professor of SNUH Family Medicine	Tubby or not tubby, fat is the problem
Professor of SNUH Bstetrics	Maternal physiology for primary physicians
Nutritionist of SNUH Health Promotion Center	Evaluation method of exercise & nutrition in a health promotion center
Professor of SNUH Radiology	Ground glass opacity nodules in the lung
Professor of SNUBH Family Medicine	Medical research ethics: conflicts of interest
Professor of SNUH Cardiology	ECG reading & diagnosis of arrhythmia for clinicians
Professor of SNUH Endocrinology	Recent advances of diabetes research
Family Medicine physician of the US Army Stationed in Korea	Trans-nationalism
Professor of SNUH Ophthalmology	Funduscopy reading in health promotion center
Professor of SNUH Neurosurgery	Endoscopic spine procedure
Professor of SNUH Urology	Recent advances of prostate cancer

SNUH: Seoul National University Hospital, SNUBH: Seoul National University Bundang Hospital.

discussions of articles or textbooks and presentations on clinical themes.⁴⁾ However, hospitals with a small numbers of staff members or residents have difficulties preparing independent conferences when their residents are dispatched to other departments or subsidiary hospitals.³⁾ Even when human resources are sufficient, it is still difficult to maintain a high level of participation in conferences if residents are frequently dispatched to other departments or hospitals. Such factors negatively impact

the quality of continuing medical education.²⁾ In 2007, there were 104 hospitals with family medicine residency training programs in Korea. 60% of them were secondary hospitals, and 34 hospitals had only one family medicine staff member, while 30 hospitals had two staff members.⁶⁾ According to a study conducted in 2003, 24% of family medicine residency training programs in Korea had one or two family medicine residents, and 33% had three to six residents.⁴⁾ Joint videoconferences between hospitals

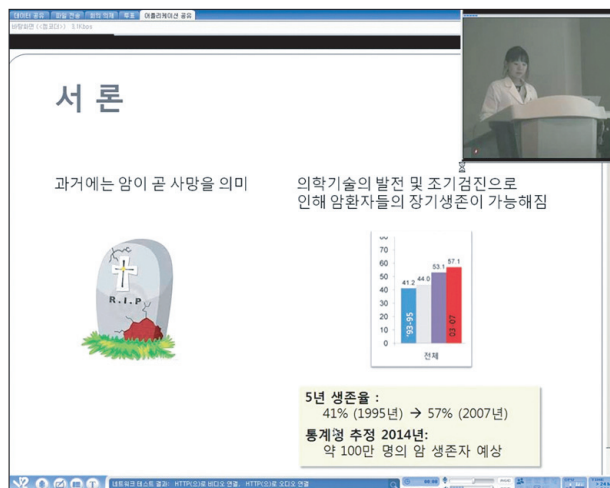


Figure 1. Video conferencing on a remote computer; the same resolution as presenter's monitor.



Figure 2. Presentations were transmitted in real time to remote conference rooms (Seoul National University Bundang Hospital, Department of Family Medicine).



Figure 3. Presentation came across in real time to the remote conference room (Kangwon National University Hospital, Department of Family Medicine).

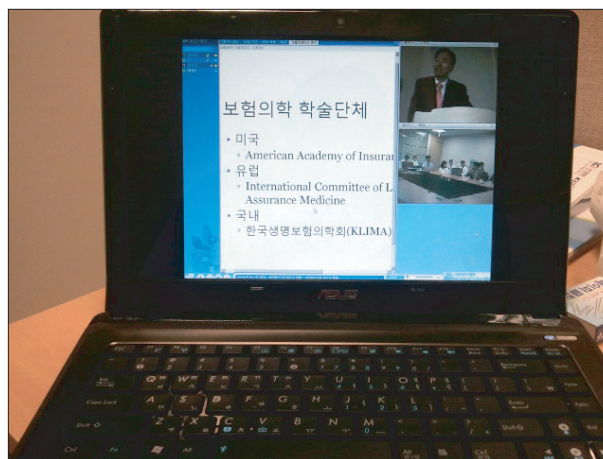


Figure 4. Using a laptop to join video conference.



Figure 5. Screenshot of feedback and discussion after presentation.

through videoconferencing technology could be a solution to this problem. Speakers and audience in various geographic locations are able to exchange multimedia information, such as sounds, images and data, in real time through a videoconferencing system. Such systems may overcome time and spatial limitations and expand the range of education available.⁷⁾ The quality and satisfaction rates of education through videoconferences are comparable to those obtained with conventional conferences.^{1,8,9)}

Two small departments of family medicine (SNUBHF, KNUHF) that lack resources shared 81 joint videoconferences with SNUHF, which has sufficient human resources, over a period of seven months through a videoconferencing system. After this period, we asked the members of SNUBHF and KNUHF about their satisfaction with the system. Most of the staff members and residents of SNUBHF and KNUHF were satisfied with joint videoconferences. All of them agreed

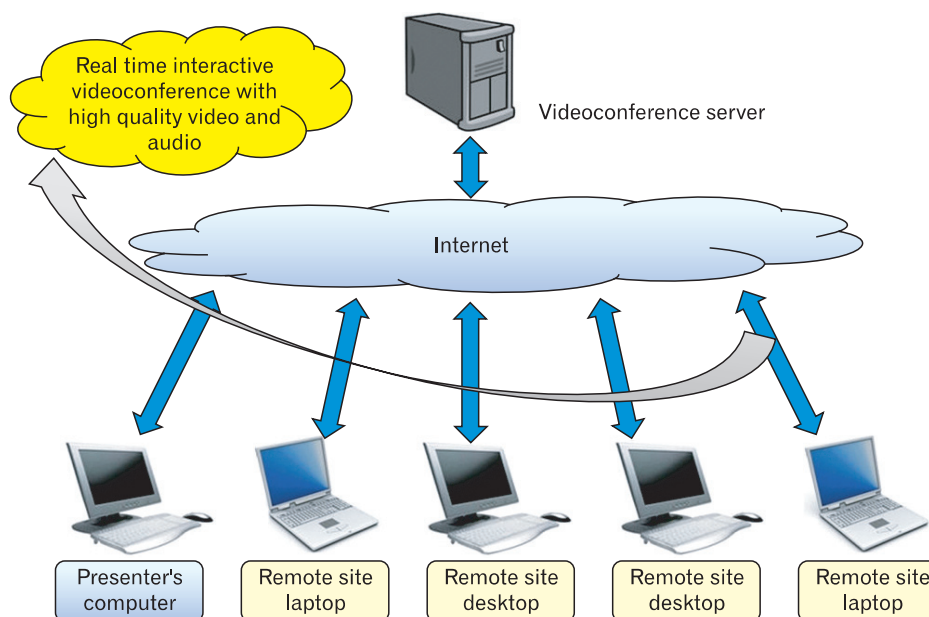


Figure 6. Video conferencing server-client network.

that this system was helpful not only for the residents but also for the staff members in obtaining the latest knowledge in various areas. Residents were able to learn and receive feedback from residents and staff members of other hospitals. Because of these results, joint videoconferencing has been sustained between three hospitals.

Despite these positive results, it is undesirable to depend entirely on joint videoconferencing since each hospital has unique issues and cases that might require more specific medical education. KNUHFM has added joint videoconferences to its own conferences which include topic review on Wednesday during lunchtime, case conferences on Tuesday and Friday afternoons, and journal review, book reading and obesity and anti-smoking education on Tuesday afternoons. Some improvements also need to be made to enhance the conferences, including the quality of the audio system, the stability of the videoconferencing system and the frequency of active discussions among hospitals.

2. Equipment Issues

General web cameras are sufficient for small-scale conferences in which two or three people participate and watch the presentation on a computer screen. However, web cameras are not appropriate for large-scale conferences in which more than ten people participate and speakers make presentations from a podium. Cameras used for large conferences should be remotely controllable, rotate 180 degrees, have high resolution, move

up and down 90 degrees, and be freely zoomed in and out to transfer a realistic conference atmosphere to remote locations. Cameras that we used for joint videoconferences fulfilled these requirements.

The audio system is an important element in videoconferencing. Slight decreases in the quality of the image did not cause major inconvenience, but low sound quality led to communication difficulties and decreased concentration on the videoconference. Personal headsets or general speakers connected to computers are good enough for small-scale video conferences. However, because general speakers and microphones can produce howling and echo effects, which degrade the quality of the videoconference, they are not appropriate for large-scale conferences in which many participants may speak freely at once. Therefore, an echocanceler that eliminates echo effects and howling should be used for larger conferences. Generally, echocancelers for videoconferences are expensive, costing more than 1 million Korean won. We made an effort to build an affordable, cost effective conference model. After researching our options, we decided that we could purchase an echocanceler (XING) at 240,000 Korean won.

In conclusion, joint videoconferencing between multiple family medicine departments is feasible, satisfactory and useful for continuing medical education, especially when the participating family medicine departments lack the resources to hold regular conferences on their own. We expect that more family medicine

departments will participate in implementing such joint videoconference systems in the future.

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